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THE JOURNAL OF PHILOSOPHY

LIMITS OF METHOD

MANY men, many minds, many methods. Although no single method stands unconditionally in the pursuit of knowledge, there are some which may be thought to excel by far and even to contradict and nullify others. The scientific method is perhaps foremost in this regard. What this method is, whether it is not a loose and undetermined aggregate of many distinct methods, whether it is not doctrine as much as it is method, and other questions, might be asked about it. One feature of it, submission to the object, or, in a word, objectivity, passes unquestioned. Many men who are not scientists are submitted to objects, even to the extent of enslavement, however; and again it may be said that some of great renown who are scientists have reversed the relation and submitted the object to a concept of theirs. We might go further and say that any method of acquiring knowledge does or attempts to do this. It is therefore open to serious question that objectivity is so much a character of scientific method as we are accustomed to think it.

Suppose a naturalist completely submitted to nature, his mind a *tabula rasa*. This would be an instance of objectivity *par excellence*. It would not be an instance of a scientist, however, or of anyone else to whom we attribute much knowledge. What would register on the *tabula rasa* is quite uncertain, though we may surmise that it would not greatly exceed the registry to be found on a photographic plate. In that case the impressions, or some of them, would quickly fill up the plate, crowding, muddling, and obliterating one another, leaving an inscrutable blur. The stream or jumble of events—that is, objects to which we are to submit—is so complex that unless we do something more than submit, we are soon confounded. Instead of this passivity, suppose a perceptive, discriminating, inventive intelligence; it will select the things it submits to, according to its genius. These it may analyze, compound, or transform. That is not submission. It may bring them under certain concepts, or invent theorems concerning them. That is submission, but which is submitted more, the mind or the object, is not easy to say. Yet this is science, and also philosophy and art.

Scientific objectivity is an ideal or standard, a certain philosophy (realism of a kind). It is in no way more impartial than rationalism, and is far less capable of perfect detachment or impersonality than reason is. As a criterion of knowledge it is therefore nothing uniquely virtuous. Neither is it a method, but rather the aim of method. Not, however, the aim of scientific method uniquely or in particular; for every method has this aim of conducting to a preconceived end or along a preconceived way. We proceed upon some hypothesis or in conformity with some tenet at every step unless we lapse from our purpose.

Method itself is twofold: (1) prescriptive, (2) derivative. In the prescriptive sense it guarantees conformity to a program, and also economy in the execution. Here the distinction is certainly in the economy, since the conformity is not strictly method but rather an extension or application of purpose. The virtue of Occam's razor in all fields, so far as method alone is concerned, is a sign of this economy. Method is thus technique, craft, rote, a tool, and one may be expert in it without being a scientist, artist, or philosopher. When it is said in textbooks that what is there called scientific method is a certain regimen consisting of observation, hypothesis, deductive inference, and experimentation, it can hardly be intended that to be a scientist one has to respect this regimen, for if that were the case many who have been honored as scientists could not qualify.

The virtue and limits of method are amply exhibited in philosophy because of the many and very different instances of method to be found there and because of the catholicity of the matters treated, and, we may add, because of the resourcefulness of mind which has been brought to the solution of philosophic problems as well as the discovery of them.

The method of Socrates, though some may think it imperfectly followed by him, was like an invisible and exceedingly potent ray which might discover and illuminate every affair of the mind and the world. Yet it was not his method that ennobled and fulfilled human faculty so conspicuously in Socrates, except in a secondary sense. It was not the method directly that accounted for the greatness of the objects to which that philosopher was devoted. His method was a derivative of his powerful motive towards universal light.

Clearness, distinctness, and thoroughness, which were requisites of the Socratic dialectic, were also the mark of Descartes' celebrated method, and not less of Pascal's. But though they are marks of all these methods, they certainly are not due to the methods, but rather the converse: the methods are regulated by them,

or we may better say they are short abstracts of them. John Locke, too, had a method, the "historical, plain method," and it was at his service, not he at its. Bacon is a like example. Spinoza and Hobbes, having in advance something to expound, find appropriate devices or methods to the purpose. So also Kant, but most notably Hegel, who came perhaps nearest of any philosopher to a perfect fusion of method and matter. Philosophers who, like John Dewey, reject the idea of a universal clavis and hope only to move aptly and resourcefully with the flux of things, still have purpose and standpoint, which are not governed by the methods they invent, but govern the methods.

In recent times the method of analysis, greatly refined, has been so fruitful that the supposition has arisen that it is the sovereign or indeed the only philosophic method. Through the development of this method in logic it is found, or presumed, that many perennial questions of philosophy, if not entire domains of philosophy, are illusory and are only due to deficiencies in the old logic and the consequent inability of all parties to deal with them precisely.[1]

[1] For instance, Russell discredits a good deal of Hegel by reason of an alleged failure of Hegel to distinguish between the relation of identity and the relation of predication (*Our Knowledge of the External World*, pp. 41–42). Further, he says: "In some problems, for example, the analysis of space and time, the nature of perception, or the theory of judgment, the discovery of the logical form of the facts involved is the hardest part of the work and the part whose performance has been most lacking hitherto. It is chiefly for want of the right logical hypothesis that such problems have hitherto been treated in such an unsatisfactory manner, and have given rise to those contradictions or antinomies in which the enemies of reason among philosophers have at all times delighted" (*Mysticism and Logic*, p. 112). The like criticism is nowadays to be found also in textbooks of logic; e.g., Cohen and Nagel remark, in their *Introduction to Logic and Scientific Method:* "One of the most fruitful sources of intellectual confusion is the too facile assumption that any two propositions which are not equivalent are mutually exclusive. Thus men have debated about the relation of mind to body, of heredity to environment, of selfishness to altruism, of art to nature, frequently without realizing that while the alternatives are not equivalent, it does not follow that they are mutually exclusive. . . . The bitter fights between idealists and realists, between revolutionists and conservatives, between evolutionists and fundamentalists, between theists and deists, have been waged not only on the [erroneous] assumption that the respective points of view are exclusive of one another, but also on the [erroneous] supposition that if one of the parties were proved in the wrong, the other would be proved right" (pp. 68, 71). On grounds somewhat akin, though of more positive character, viz., that philosophical judgments always include species which to science are mutually exclusive, R. G. Collingwood undertook to show that philosophy has the task of exhibiting the overlap of specific classes which for practical or scientific purposes may be treated as if they do not overlap (*Essay on Philosophical Method*, Ch. II).

Now if the special office of philosophy is precise, apodictic demonstration, or the determination of the means and conditions of such, there is no ground for questioning this doctrine of analysis; and, moreover, it is evident that something of the kind is the proper business of some special department of knowledge, call it philosophy, as distinct from another department (science) having as its province the description of phenomena or the description and philosophic interpretation of phenomena. Supposing the entire domain of knowledge partitioned in this way, the analytic view of philosophy will be justified.

Even if we presume additional philosophic means, such as a formative, synthetic faculty, it is very doubtful that we have in that anything not submitting to the foregoing terms. The ebullition of mental forms and states, in art and religion, for example, is not theoretically beyond the apprehension of analytical philosophy, to say the least. Perhaps if it is mystical to some, the reason is that they have stopped at an obscure, that is, unanalyzed and unrationalized consciousness of it. In any event, if we have here only some primitive act or unprobed sentiment or *je ne sais quoi*, it is material for psychology or physiology; while if it is thought to be something of intelligible significance, it must yield to an intelligible accounting.

In all these cases the method concerned is prescriptive. Before it was prescribed, however, it was of the other kind we have noticed, namely, derivative. Having evolved in the mind of a certain thinker, each method is applied as if it were universally apposite. This presumes the world to be universally or exhaustively figured in the method—a feature of method is that it should sweep or presume to sweep the field of rival methods. But the presumption of exhaustiveness is one which is not truly about the world, of which we can claim or presume very little that is exhaustive; rather it rests upon a resolution of him making it that he will regard the world in just the way denoted by his method. This method he imposes at pleasure until it is superseded by another, which then follows a like career. Methods are like creeds: projects or inventions of mind.

It is thought, however, that method advances, whether by latent evolution or by strokes of genius.[2] That it advances of itself is by no means evident. In technology and practical endeavor

[2] Mr. Russell remarks, "This possibility of successive approximations to the truth is, more than anything else, the source of the triumphs of science, and to transfer this possibility to philosophy is to ensure a progress in method whose importance it would be almost impossible to exaggerate" (*Mysticism and Logic*, p. 113).

there are many cumulative advances, as in the control of disease or the use of machinery, but probably there is regression also, for instance, in craftsmanship. If the question is whether such advance occurs in the ways of knowing, the answer is less certain. The science of physics has but lately reached the stage where it thinks of events as Hume thought of them two centuries ago. No science, I believe, and not much philosophy, is sufficiently refined or mature to venture the use of methods like those of Spinoza and Leibniz. The method of Plato is perhaps beyond the capacity or temper of our age. We can hardly maintain, therefore, that method rises of itself or is even sustained by its own virtue. If a certain method which is followed today is superior or inferior to previous ones, the reason need not be in the method alone but in a greater or less fineness of view or aptness of view imbuing the method.

This fineness or aptness is only secondarily of the method, for the method reflects its author or a concept which he holds. Suppose the method is that of analysis, having the purpose of ascertaining the premises of some piece of knowledge and their consistency or probability. The piece of knowledge being the outcome of a transaction of mind, and every method an application of some piece of knowledge, it is the latter, not the method, that calls for accounting. Let the piece of knowledge, or postulate, or belief be, for example, that there is an external world unaffected by our knowledge and itself the object or complement of knowledge. This is certainly an idea formed of much reflection, for it is not a sense datum and is hardly inborn. Analysis of it would soon bring out, among others, two things of interest: inference and induction. The validity and presuppositions of these are questions soon met, and beyond them are other questions, such as the categories of being and the ontological import of propositions. If analysis is the means to answers here, or if it is the means most suited to some though not all minds, then challenge of it must rest on misapprehension. That it should seem to involve the paradox of yielding only what we already have to start with, is scarcely an impediment, since what we have implicitly may not be available explicitly or even known as ours implicitly. And it is a conspicuous task of analytical philosophy to discover the presuppositions and consequences, unwarrantable or intolerable as they very often are, of opinions, doctrines, and propositions of all kinds.

But when all is said, analysis, like method, seems a secondary and dependent thing. Unless provided matter to analyze, it is nothing; and whoever provides this will surely appear to have transcended the accomplishments of analysis and even to have

included them, tacitly, in its results, so that they need only to be read off by the analyst. Through analogy with concrete things we may think it necessary that the mind possess eminent conceptions, such as the *semina aeternitatis* of antiquity, before it can undertake analysis worthy of philosophy; but this is a presumption only, since analysis can begin at will, and is not determined in worth or extent by the weight of its initial subject but by its own fineness and power. These qualities, fineness and power, bear in all directions, not solely from grounds to consequences, nor from consequences to grounds. When Leibniz says, "if there had ever been nothing, there would have always been nothing, since nothing cannot produce a Being,"[3] inference, analysis, crowd upon us, leading to the first principle from which this proposition stems, namely, the principle of contradiction, and endeavoring even to probe and assess that principle itself. Mr. Russell, criticizing Leibniz's idea of a universal calculus, by which Leibniz would solve all philosophical problems as an accountant would determine his sums, remarks: "But as a method of pursuing philosophy, it has the formalist defect which results from a belief in analytic propositions, and which led Spinoza to employ a geometrical method. For the business of philosophy is just the discovery of these notions, and these primitive axioms, upon which any calculus or science must be based. The belief that the primitive axioms are identical leads to an emphasis on *results*, rather than premisses, which is radically opposed to the true philosophical method."[4]

This view of the province of philosophy resembles that of Plato where Plato considers the relation between hypotheses and principles,[5] though not where he, like Leibniz,[6] considers all of these under one supreme idea, the Good.[7] Since reason admits of both progressive and regressive directions, it is not evident here that its special business or distinction lies in the regressive direction; and if it does lie that way, nothing can tell us in advance that it will not carry back to one parent idea or monad, or that it will; consequently there is no rational ground for the view that philosophy is especially concerned to determine "the" first cause or principle, though it may be concerned to determine whether such a thing is. Rather, its concern in this regard is to determine or

[3] Bertrand Russell, *Critical Exposition of the Philosophy of Leibniz*, second edition, p. 288.

[4] *Ibid.*, p. 170.

[5] *Republic*, Book VI.

[6] *Monadology*, 36ff.

[7] *Loc. cit.*

discover the order and structure of objects of understanding. Whether its outlook is initially progressive, from axioms to theorems, or the opposite, is philosophically inconsequential so long as it admits comprehensiveness or excludes nothing arbitrarily. The frequent criticism of the systematic ambitions of philosophy seems therefore beside the mark and I daresay rests upon a premise which is at least as doubtful as any the systematic metaphysician is supposed to stand on, namely, that complete order or system is in some way antithetical. If philosophy or any division of knowledge is going to investigate what it means to be, or the nature and extent of order among objects of understanding, or the ability of thought to rationalize these objects, how can it pronounce against system in advance? Rather, it would seem that a systematic test would be very appropriate, inasmuch as the undertaking is devoted not to isolated or special matters but to the whole sphere of objects of understanding. But perhaps we say that probability is against success in such an undertaking, citing the fate of systems heretofore. What is this fate? That some systems are not currently in favor or have been found faulty (from the standpoint of other systems or premises), is certainly not a disproof of them, let alone of all systems, under any plausible canon of proof; if it were, the same would have to be said of science, history, art, and what not, upon the evidence of the past. Further, probability is an exceedingly poor reliance here: What was the probability of a Shakespeare or Galileo in 1564, on the evidence of previous history, and what was the probability of the critical philosophy of Kant in 1781? The history of philosophy shows a continual endeavor to find out the evident system, like the endeavor of science to discover what is the case in the phenomenal world.

However, we can not presume, consistently with the history and possibilities of philosophy, that it is wholly devoted to determining the order of intelligible things. It may be, and has been, devoted to imposing reason or doctrine or intuition or mysticism upon its objects, as science has been given to imposing measure and manageability. Philosophy is an undefined term, or one very imperfectly defined, though it is by no means alone in this limitation. What differentiates it from other knowledge is a matter of disagreement among schools. Not that agreement among schools would decisively fix its definition, nor that such agreement is necessary; agreement might conceal arbitrariness or deficiency of understanding, whereas nothing less than an exhaustive, synoptic, and demonstrative view could be expected to match the term. As this is perhaps a requirement *ultra vires*, philosophy

may be indefinable. The like holds for all other terms, where real rather than nominal definition is concerned, inasmuch as all of them will presume philosophic knowledge. It results that philosophy may either exceed or fall short of whatever bounds we as yet try to give it, without being any the less philosophy.

If the definition of science is more rigorous than the definition of philosophy, it can only be because of, first, self-imposed restrictions and, secondly, certain perhaps arbitrary philosophic assumptions, especially concerning perception, probability, ontological import of logic, and the like. As a bare or direct transcript of phenomena, taken according to prescribed standards, science hardly differs from history and is not very much unlike drama. "Scientific knowledge is probable knowledge and changes radically from one period to another."[8] If we suppose that it is anything more, this must be owing to bias or to failure to note the philosophic presumptions involved, let alone the lack of decisive philosophic showing in favor of such presumptions. When scientific statements go beyond immediate evidence, or presuppose certain order and rationality in nature, or presuppose physical objects corresponding to percepts, they take for granted large segments of philosophy which nevertheless are not wholly certain within philosophy. So far as science does this, it is, though unacknowledged, a very partial and arbitrary philosophy. Its demonstrable certainty can be no greater than that of the philosophy it takes for granted.

The methods appropriate to science are strictly pragmatic, since the concern of science is a certain conquest of phenomena. They depend on practical circumstances and therefore vary widely. So far as they presume philosophic purposes or impose philosophy initially, they are not strictly scientific methods, but rather applications, more or less, of philosophy. Since legitimate and pressing doubts concerning the warrant for the philosophic assumptions of science may arise, it follows that scientific conclusions are correspondingly doubtful. No technique of practical procedure can overcome this limitation, inasmuch as it is a limitation lying farther back, in the presuppositions taken from philosophy. Neither will practical success in science dispel or diminish the doubt, since the highest warrant obtainable by that means is probability, and probability draws its assurance, such as it is, from this same philosophic source. In general, the ideas of science, so far as they purport to transcend empirical data and give more than impressions, are subject to the antecedent limitations and results of philosophy.

[8] Albert A. Bennett and Charles A. Baylis, *Formal Logic*, p. 385.

In the absence of a conclusive definition of philosophy, no method can be thought the ultimate one, in either philosophy or science. Any method other than hypothesis (which is only a passing token of method) would be presumptuous and prejudicial, for it would take for granted just that which is lacking, the aforesaid definition, and would institute belief where inquiry was all that was justified. Were the definition of philosophy attained, method would probably be no question; it would be one with the practice of philosophy and its pendant, science. On the other hand, anything less than this would still require philosophic justification, which is to say that it would require that the definition of philosophy be, nevertheless, attained; and since it is not attained, this pretension to a substitute method would involve self-contradiction. The like applies in science, where, as in philosophy, diversity of methods and also of first principles is illustrative.

No doubt the methods of greatest renown in philosophy, such as the Socratic and the Cartesian, should accord with the idea of first fixing the definition of philosophy, if this idea has merit. The Socratic clearly accords with it, though not identical with it; for the Socratic method intends definition—real, not hypothetical; yet it presumes, or is used as if it presumes, a transcendent realm that governs definitions, just as physical science presumes at one time that kind of realm and again one that is only concrete. The Cartesian method also intends definition—real, not nominal or prescriptive—and it probably means, when it calls for systematic doubt and for clearness and distinctness, the same thing that is meant by the Socratic method. Between such a program and the idea of identifying method with philosophy itself, there is evidently no inconsistency. Or consider the methodological correctives and proposals, less elaborate or systematic, which are made from time to time by contemporary philosophical writers; for example, that of Professor C. J. Ducasse, who states,

> . . . one of the basic maxims of knowledge-yielding method in philosophy should be that, when a question is to be investigated, one should not only ask oneself just which facts it is about, but also state them explicitly. Actually, however, they are too often merely alluded to. . . . The procedure I suggest will not only make clear the way to test empirically any hypothesis made about those facts, but will also greatly facilitate compliance with a second, equally important methodological maxim. It is that one should again not be content merely to name or allude to the question which is to be answered about the facts one has listed, but that the question too should be stated as explicitly and unambiguously as possible.[9]

[9] *University of California Publications in Philosophy*, Vol. 16 (1945), p. 146.

This again is a prescription of clearness and distinctness, just as with Descartes and Socrates. One who, like Descartes, withheld assent to a proposition as long as there was any evidence justifying doubt of it, and who took the Cartesian precautions of simplicity, order, and exhaustiveness in his inquiries and reflections, need not, we may suppose, fail to meet the requirements urged by Professor Ducasse.

The idea of a universal method being found to exceed our powers, we may ask whether there is not a second of it, something less than it but useful to us in the search for knowledge, and also justified philosophically. We may even venture to insist that method is only zetetic and hypothetical and is misconceived when treated as if it were absolute. Now this will mean that method is not to be regarded as prescriptive, or, if so, it is prescriptive only upon positive grounds, such as would justify probability statements. Let us ask just where these grounds might be located. Certainly not in the future, and not in any other quarter beyond the reach of our knowledge. Within this limit they stand as certain items from the past. Under the alternative we are considering they are to be projected upon the future, although it would not be illogical to deny them a future. So it appears that this ground for a method is by no means non-prescriptive as supposed. It would require that we prescribe events, in the proportions of the past; and this is a presumption of, it may be, no higher justification than that of the absolutist who, instead of events, prescribes certain order of which his method is a sign. Indeed we have here the same thing, in miniature, as the idea of universal method, and it fails where that fails. Both beg the question concerning what is not yet.

It is accordingly out of the question to look for a strictly objective method. Either there is no method other than, shall we say, confidence, which begs the question, or else it will have to be a method peculiar to the individual. Doubtless the individual who is submitted to objects, either tangible or fictitious, will found no method, unless it should be one for regulating his submission. For philosophy the methods to be expected will be such as allow the philosopher to fix meanings, clearly and widely, and to determine their system; also to bring forth ontological interpretations of such system and to show what epistemological warrant these will require; or else, by ultra-rational insights, to resolve the mind's questions more luminously and fully than reason can resolve them. It is out of the question to make a technique of this, or an article of faith, or an act of submission. Rather, it seems that the opposite of these is needed, in the form of a strong mind

arising, extending itself, expressly conscious of itself, and fulfilling itself, not privately or esoterically, or not necessarily so, but in the theater of all other minds and open to their judgment so far as they judge by light and reason. Or we may say that here it is a matter of a mind unfolding, making manifest what is implicit in its genius. The heroic exemplification of this selfhood, in the person of a Socrates or Spinoza, and, on the other hand, their disdain of the life submitted to objects of sense, are sovereign marks of the philosopher under this conception.

It would be out of the question to prescribe methods to a mind of this order. Its task of bringing to light and elaborating what is implicit in itself or in the particulars of its knowledge, is one to be executed in its own due ways. Its method will be its biography. This, however, is not peculiar to philosophy. Science and art attest it likewise, for they also are transactions of mind differing little from this, and sometimes differing from it not at all. We are in the habit of thinking science more demonstrative, open, or public, but this is a doubtful view since nothing equals logic, the organon of philosophy, in demonstrativeness, nor is there anything so public. The sense objects of science are thought to be more open than others, till we try to communicate knowingly about them, only to find that they are more private than public. The idea that science has the special merit of objectivity must therefore be rejected. The great amount of routine in scientific work, and the mechanical, impersonal character of much of it, may encourage the idea of objectivity, but it tells nothing of the transactions of mind farther back. These, so far as they concern reason or understanding, are of the same nature as philosophy, and no more admit of prescribed method than philosophy does. But once a piece of understanding has been gained, it may be taken up by others, and religiously followed, giving, in philosophy, a school, in art what is sometimes called a school but more often a band of imitators, and in natural science the objectivity in question. In all of this there is method, consisting of obedience to the master. But the master himself is the author of method.

Our interest in method is perhaps owing to an expectation that we shall find in it not only economy but also an extraordinary extension of our powers, on rather easy terms—an expectation reminiscent of the zeal in times past to find the philosopher's stone. In a narrow sense we do find something of the kind we expect. But this is not the same as a method of knowledge; rather it is a set of directions for submitting to a regimen conceived by others and not necessarily suited to us. If one expects to advance far in understanding or to rise from bondage to freedom or, more

generally, if he expects to fulfill his genius, it is difficult to see why he should be much concerned to borrow his way. In any case he must be confounded when he discovers that his course is very different from that of great thinkers and spirits of the past, including, probably, the ones he thinks he is emulating; who, instead of submitting their minds to others, strove to better what others had done and especially to draw forth their own implicit light. The subserviency to method nowadays, on the part of scientific men especially, is a close match for the faith in supernaturalism which these very men disdain. That it should ever have got into philosophy that anything of this kind is the sovereign way to knowledge or salvation, is exceedingly strange.

PETER A. CARMICHAEL

LOUISIANA STATE UNIVERSITY

BOOK REVIEWS

Human Destiny. LECOMTE DU NOÜY. New York: Longmans, Green and Company. 1947. 289 pp. $3.50.

A large readership, it has repeatedly been shown, awaits any scientist or philosopher who argues or appears to prove that science has not destroyed the ground for belief in the supernatural. It is shown once again in the enthusiastic public reception given *Human Destiny,* written by the recently deceased Lecomte du Noüy, biophysicist who was long an associate of Dr. Alexis Carrel at the Rockefeller Institute and who later became head of the biophysics division of the Pasteur Institute.

Human Destiny has been strongly commended by theologians as a great work in "natural theology." Certain scientists, such as Robert A. Millikan, have also praised it unreservedly. Drawing eclectically on nineteenth-century idealism, Bergson, Eddington, Whitehead, and Alexis Carrel, with bits of Plato, Aristotle, and medieval scholasticism brought in for good measure, *Human Destiny* is a book in which tens of thousands of persons disposed to have faith in the supernatural, and wishing to feel that their faith is "scientific," will find support.

The critical-minded, however, whether of scientific or philosophical orientation, can hardly be impressed.

"Science was used to sap the base of religion," says Dr. Noüy. "Science must be used to consolidate it."

To demonstrate that there is no genuine incompatibility between the outlooks of religion and science on man and the universe is the

difficult task he took up in this book. And to argue that whatever incompatibility there is derives more from the limitations of science than of religion was his additional task. Dr. Noüy sought, specifically, to give scientific justification to Christianity and, even more specifically, to Pauline Christianity in its traditional organized form. For reasons to be cited his difficult mission can hardly be considered a success.

The core of Dr. Noüy's argument is that "unless a finalistic point of view is adopted" the story of evolution "completely escapes our understanding." It is his method throughout, whenever confronted by a difficulty, so to adopt a "point of view" that "resolves" the difficulty, "solves" the problem. Finalism, he holds, must be assumed to have "a very ultimate goal"—hence telefinalism, a goal moved toward from far off. What the logical compulsion is for this second assumption in a chain of purely abstract reasoning he does not say. And

> telefinalism is in accord with one of the most ancient and respectable of human traditions, which inspires and directs the whole Christian world, though its origin is unknown: the Bible. This parallelism was absolutely unforeseen [by Dr. Noüy in assuming his way toward the telefinalistic hypothesis], and yet our conclusions are identical with those expressed in the second chapter of Genesis, provided that this chapter is interpreted in a new way and considered as the highly symbolical expression of a truth which was intuitively perceived by its redactor or by the sages who communicated it to him. [P. 112.]

Dr. Noüy nowhere indicates the methodological rationale for his interpretation of the symbolism in order to show why it should be accepted against the claims of other interpretations; nor does he show why the second chapter of Genesis should be accepted as merely symbolical rather than quite literal primitivism. Dr. Noüy here, as in various other aspects of his thesis, appears to depend for acceptance on authority, presumably his authority as a scientist. Yet in the course of his book Dr. Noüy complains—and here there is room for much agreement—that science has attained the status of a religious-like cult with its practitioners often standing forth as a priesthood at no pains to confess either their fallibility or their vast ignorance about many important things. But except to the unthinking, who are numerous, science confers no authority upon anyone. Mere assertion by a scientist has no more scientific force than mere assertion by anyone else, unless it is made clear that the assertion rests upon and is verifiable through the application of scientific method. Scientists, outside their field of specialization, their special scientific methods tacitly discarded or inapplicable, appear to be as susceptible to Bacon's four *idola* as the average citizen.

Whatever approaches there are to the riddle of life and the universe that fail to invoke supernatural, mystical, or, as he terms it, hyperscientific explanations, are regarded in *Human Destiny* as barriers to a true view of the metaphysical catch-all commonly and traditionally termed "reality." Opposed to materialism, mechanism, and naturalism, Dr. Noüy is also necessarily opposed to determinism, and slights the tremendous evidence supporting it in order to dwell upon the slight but nevertheless arresting evidence in favor of free will. The tiny spark of apparent free will that man displays in what may be likened to an ocean of determinism is suggestive of itself, and may signify much in the history of man. But, even if this is so, as one is inclined to feel, there is nothing to be gained for a veracious description of the cosmos by denying that the area within which man's free will may be exercised is very small, that it is indeed but a flyspeck within a vast deterministic matrix.

Dr. Noüy's slighting of determinism in order to stake the whole of his metaphysical fortune on free will is his method with respect to all the classic antinomies of speculative philosophy. The evidence for teleology is emphasized, that for mechanism is brushed aside without discussion; the evidence for design is considered impressive, that for chance is ridiculed. Such a procedure must inevitably fail to carry conviction except to the unthinking.

And because of his cavalier approach to an infinitely complicated subject-matter, for which the finest minds in the history of human thought have not been able to devise generally satisfying conclusions, Dr. Noüy lands himself in inextricable internal difficulties with his theme. First, his view of mind is Kantian, but to an extent that would have been too much for the master of Koenigsberg, who considered it possible to obtain genuine knowledge about phenomena. Reality as we apprehend it, Dr. Noüy holds, is the whole-cloth creation of our minds.

> Our science is admirable and prodigious. Inasmuch as it is a creation of the human brain it calls forth an even greater admiration for the latter, which constructed it. But we must remember that we ignore, and probably shall always ignore, everything of the relations between the mysterious and hypothetical universe, created by our logic and genius with the help of the elements furnished by the deforming mirror of our senses, and the real, silent, colorless universe. The splendor of the world was born from the impact between it and our consciousness. [P. 27.]

Again, "our knowledge is subjective, and conditioned by the structure of our brain."

If this is so, Dr. Noüy was logically required, under the terms he himself laid down, not to discuss some special facet of the uni-

verse as though it were or might be an objectively knowable affair. Yet he nevertheless discusses evolution, and the scientific evidences for it, as though it were, as evolutionists hold, a knowable process in time outside our selves and antedating our selves, and as though it were guided by an objective externally discernible purpose. There is no evidence that Dr. Noüy was at all aware that, by adopting this view of the inaccessibility of the *real* universe to our minds, he foreclosed himself against making observations about such an external supposedly universal process as evolution.

And if chance, as he argues, is a subjective notion, a statistical construct, along with many other practically useful ones of science, it must follow that purpose is also subjective, having no greater universal validity. He is unable, of course, to show any more valid objective ground for the idea of purpose than for the idea of chance. Indeed, the grounds for establishing purpose, both experiential and rational, are vastly less than for chance.

And if the view of the universe depicted by science is no more than the personal fantasy of scientists projected upon nature, then Dr. Noüy should not have discussed the evolutionary process as though it, exceptionally, might not be fantasy. It follows from his argument, too, that the Judeo-Christian account of the origin of life, however symbolical it may be, is equally a fantasy; for the composers of the Bible even in Dr. Noüy's argument had no deeper insight into the origins of life than the originators of the doctrine of evolution. And the assertion that the accounts of evolution and of Genesis are both the same is irrelevant. For then it is merely a case of duplicate fantasies generated by the human mind, unless one is disposed to imply, as Dr. Noüy does, that the universe is distorted only in the minds of modern physical scientists but was not so distorted in the minds of writers of the Bible, who proceeded through intuition rather than through epistemologically defective experience and reason.

Difficult though it is to reconcile the organic and the inorganic metaphysically, chemistry does not sustain Dr. Noüy's contention that they are completely unrelated, even though Dr. Noüy is unquestionably correct in maintaining that one can deduce the inorganic from the organic, but not the reverse. But the fact that there are irreversible analytical thresholds in our sciences—by which he means that we can begin analytically with crowd psychology and trace our way to individual psychology, to biology, to chemistry, and to physics, but we can not begin with physics and trace our way to the behavior of crowds—does not make out a case for a First Cause. Science is analytical, ever seeking to understand the whole by investigating its constituent parts, and it is

evidently in the nature of analysis, which invariably considers only what is *there in the large*, not to be able to proceed from an extremely minute part to some totally unknown whole. So our inability to make an analytical round-trip, as it were, may conceivably be blamed upon the inadequacy of analysis, which seeks out only smaller and smaller aspects of things. And the fact that one is able to begin with crowd psychology and wind up analytically in the nether depths of physics may well be, and undoubtedly is, because the physical phenomena are present all the time. It is not necessary, in order to reach them, to proceed via individual psychology, biology, and chemistry at all. The reason one can not arrive at laws relating to the behavior of crowds by starting to scrutinize the phenomena of physics is unquestionably because the behavior of crowds is not involved in the phenomena of physics, although the reverse is invariably true. What this does is to bespeak the pervasive character of the phenomena of physics, so far as we know, and the non-pervasive character (in decreasing degree) of the phenomena of individual psychology, biology, and chemistry. All phenomena, in short, are irreducibly physical, including the phenomena of life.

"We must not confuse these human, subjective laws [of science] which our intelligence has superposed on facts," Dr. Noüy warns, "with the true, eternal laws which will, perhaps, always escape us." One would be only too happy to heed this caveat, discarding the scientific fantasy entirely, if we could only grasp these laws. But how, if we can not even apprehend them, can anyone assert they exist? To know they exist one must have some evidence for them, which evidence should tell us something of their nature.

The laws of chance, probability, while yielding roughly practical results in the physical sciences as far as man's crude scale of observation is concerned, not only fail to account for the specific nature of reality but also fail to account for the origin of life as well as its complex, multi-formed development. Dr. Noüy in so contending follows Bergson, although he attempts to bolster the point mathematically. Proceeding on the basis of the empirically unestablished armchair notion of an unlimited range of equal probabilities, he is able to show that it is highly improbable that chance, in the approximate billion years life has been on earth, would have had time enough to create more than two or three molecules of extremely simple organic matter, let alone hundreds of millions of identical complex molecules. What is evidently fallacious about such theoretical computing is that neither Dr. Noüy nor anyone else could know in the present state of knowledge

under what conditions chance functioned at the time—provisionally assuming for our part that it did function. And neither Dr. Noüy nor anyone else knows what elements of chance may or may not have intervened to accelerate the process. He admits—fatally to his contention—that it is possible within the range of probabilities for an initial run of "beginner's luck" to have established a long coherent sequence, without the cosmic dice having been loaded. Whether chance did or did not rule the primordial roost, however, we can not say we know. And if it did rule, we don't know whether it was playing mere heads-and-tails or with a deck of two cards, fifty-two cards, a billion cards, or an infinity of cards. Nor do we even know what game was being played, and the nature of the game itself does much to determine chances. The chances of drawing a ten-card in the standard deck of 52 cards is 1 in 13, but if it happens that the rules of the game allow a value of ten to all cards above ten, including the ace, the chances are 5 in 13 or nearly 1 in 3. One can say with certainty, looking casually at a great variety of games, that they are all games of chance. But what the chances are in each, one can not say without knowing the game and the various factors involved. What are the chances of scoring repeats of certain numbers with a set of dice, not necessarily a pair, the markings of whose sides are unknown and are not necessarily regular? Mathematics can not work with such a question, yet this is precisely the sort of question to which Dr. Noüy applied mathematics.

Science does at least know that the concept of chance satisfies such of the many facts of nature as are under its direct, present observation. It has much evidence to show that nature and the universe are extremely chancy affairs. And it does know that, so far as observation has taken it, it has been unable to discern the influence of any validly formulable universal purpose.

Science is itself a process of development, not something fixed and static—a truism, beyond question, but one requiring mention in view of Dr. Noüy's formulations. Dr. Noüy assumes that science has finished its work, has come to a dead end, which experience suggests is far from being the fact. A cardinal rule that has guided science has been never to fall back upon "revelation," the miraculous, or "hyper-scientific," as Dr. Noüy counsels doing. Thus invoking the miraculous has always been scientifically defeatist, and *Human Destiny* is scientifically defeatist.

The scientific edifice, as it stands today, can only be related to non-living matter, Dr. Noüy believes, there being no relationship between the organic and inorganic. This is surely a strange position for a scientist to take.

To study the most interesting phenomena, namely Life and eventually Man, we are, therefore, forced to call on an anti-chance, as Eddington called it; a "cheater" who systematically violates the laws of large numbers, the statistical laws which deny any individuality to the particles considered. [P. 38.]

God, in Dr. Noüy's view, sat playing an apparent game of chance with himself, such as solitaire, but cheated in order to make it all come out right. God's aim in establishing a cosmically vast crooked game, virtually endless in time, was the production of a superman: religious prophet, scientist, artist. Cosmologically, the end of all the effort seems rather trivial even though one has respect on a mundane scale for supermen, be they genuine or spurious. Dr. Noüy does not consider the possibility that the end in view of such a cosmic cheater might itself be a bit of fraud.

Theologians often assert that science has stripped man of his dignity. In fact, man never had cosmic dignity (whatever he felt to the contrary) until science described the cosmos, for then man at once became a cosmic hero, playing the game against hopeless odds. Cosmically, he was "expendable" and, as such, a creature invested with dignity and stature proportionate to his understanding of his rôle and his willingness to discharge it without hope of great reward. The predestined superman of Noüy's cosmos is, by comparison, a drab figure, a superintendent directing a horde of incompetent inferiors.

Because our knowledge is subjective and conditioned by the structure of the brain (excluding our knowledge of organic evolution and the knowledge of the Bible writers), and because our intellect has thus far failed to produce some desired answers, Dr. Noüy says, "intuitive irrational concepts are not to be scorned." Why this should follow, as the irrational is also conditioned by the structure of the brain, he does not indicate. Rational conceptions are at least subject to some testing by objective means, however selective and limited in space and time those means may be. Irrational conceptions are subject to no such test and are, in fact, almost wholly subjective.

Intuition plays a central rôle in Dr. Noüy's approach to what is known as reality, and here he follows as closely in the footsteps of Bergson as in his teleological views. But to conclude, as Noüy does, that intuition is an instrument of insight rising superior to reason is to press this particular thesis much further than any prestige he may have enjoyed as a scientist can possibly carry it for intelligent people.

There is, when intuition is empirically considered as in clinical psychology, unquestionably more to it than the average materialistic scientist would be inclined to admit. But there is also much

less to intuition than Dr. Noüy endeavors to make out. Far from being an instrument superior to reason, far from it being a matter of choosing sides between the two, both function psychologically in the closest harmony in all fruitful thought. Induction and inference, for example, appear to rest on intuition, are not at bottom the products of reason. The basic postulates of mathematics must be grasped intuitively. Again, the history of human thought is studded with examples of correct intuition, as for example in the Democritean notion of a universe built of atoms. But for each such success of intuition, an overwhelming host of failures could be cited. There are, in short, many entries in the intuitional sweepstakes, and most of them are losers. Reason alone, unsupported by experience, is itself almost as barren. All intuition amounts to is "hunch," and whether it is correct depends, obviously, upon the test of experience and reason.

Unlike clinical workers with the irrational, the psychiatrists, Dr. Noüy was seemingly unaware that the conception of the irrational is by no means empirically satisfactory. He assumes that whatever is not rational, ordered by conscious reason, must be irrational—one of his many black and white dichotomies. To get around the difficulty the clinicians have developed the concept of the extra-rational, relating to manifestations clearly not rational —such as falling in love—but also clearly not irrational. Most of readily observable human mental activity is in fact of this order: neither rational in the sense of being directed by logical processes nor irrational in the sense of being contrary to logic. Intuition, then, is not necessarily irrational. And while it can not be brushed aside as mere nonsense, it can not, contrariwise, be elevated to superior status over experience and reason owing to its uneven performance. According to the clinicians, some persons for reasons unknown have a definite flair for fruitful intuition, and the greatest intuiters of all, it seems to this writer, have been certain mathematicians, philosophers, and scientists and not, as Noüy is inclined to have it, the religious prophets.

What we know and surmise about evolution, says Dr. Noüy in echo of Bergson, noting especially the repetition of the eye in many diverse species of animals, argues that there was originally visualized certain goals. Mere chance, it is held, can not account for a phenomenon like the repeated appearance of the eye, although within the bounds of probability there is always possible a run of luck that makes it seem as though the dice are loaded.

While all this about Bergsonian purpose may be as true as it is old, for all one knows definitely to the contrary, it is extremely doubtful that Dr. Noüy or anyone else knows, yet, what the grand

teleological goal may be, assuming that there is indeed such a goal over the horizon of time. According to Dr. Noüy, the cosmic goal is man, and the development in man of conscience, morality, and "spirituality." This last, one gathers, means no more than adhering to some religious outlook. Dr. Noüy's constant presumption is that religion always plays a benign rôle in human affairs. Contemporary events in India, to look no further afield, cast some doubt on this notion. But because there have been religious martyrs—i.e., fanatics—"every religious ceremony," Dr. Noüy says, "no matter how weird it seems to us, should be respected." To this reader this is clearly an injunction to respect human as well as animal sacrifice, flagellation, suttee, temple prostitution, self-mutilation, the exorcising of devils, the laying on of hands, self-immolation, and the like.

The entire universe is incomprehensible without the "hypothesis" of God, says Dr. Noüy, but the permissibility of introducing such a large hypothesis merely because of our lack of precise knowledge in certain matters is obviously doubtful as a scientific proposition. The hypotheses of science are usually quite modest, are always provisional, and are retained only as long as they make possible progress in ascertaining new facts. As soon as they fail to function as levers to pry out new facts they are discarded. It is interesting to observe that Dr. Noüy accepts without reservation the idea of evolution, perhaps the largest hypothesis of modern science, the one least susceptible of sufficient proof, and the one that is most clearly an article of faith. Interestingly, it is this very large and only fragmentarily supported hypothesis of science, most of whose "links" are missing, that is invariably leaned upon most heavily in latter-day attempts to reconcile traditional religion and science.

Dr. Noüy has his own special "proof" for the existence of God. He says: "It is not the image we create of God which proves God. *It is the effort we make to create this image*" (p. 135, italics Noüy's).

All of what has been discussed—and there is more that one might take issue with, such as Noüy's belief in Lamarckian inheritance of acquired characteristics and his failure to make any allowance whatever for social influences in the shaping of "supermen"—is but lengthy preamble to justification of a reactionary social program. Fundamentally Noüy's book is neither about religion nor cosmic matters. He is interested in science, evolution, philosophical questions, and religion in the main only as they have a bearing, in the end, on the establishment of an ultra-conservative social order—an authoritarian, hierarchically-ordered

society devoted to the leader-principle and dominated by an intellectual élite holding sway over an obedient, tractable, breeding mass of church-going inferiors.

The superman aimed at in the teleological evolutionary process emerges as a member of the ruling social élite, which represents the "higher" spirit against the "lower" flesh. The idea of the superior moral status of the artist, scientist, and religious leader might, however, through the citation of numerous case instances, be severely impugned. Enough of each have shown themselves willing to serve whatever master offered—it seeming to make little difference to them what political, social, and moral values they forwarded—for any one of them to be held up as a general class representing the closest approach to moral perfection.

This review is no doubt overlong for such an easily disposed of work. But with a large readership subjected to such views in the name of science, consequences may follow, also in the name of science—consequences that are not conducive to the achievement of a free society of free men. An extended critical warning therefore seems in order, if only to offset in some measure the recommendations being made of the book in the pulpits. It is a pity the author did not live to defend his work, but the book itself is there and it does not lack friends as capable as Dr. Noüy to defend it. Less in Dr. Noüy's book than in what might blossom from it under the ministrations of other men would any political danger appear to lie, although Dr. Noüy came very close to blueprinting in the name of science something closely resembling a clerical-fascist social order. But a scientist, a scientific worker, in order to have written *Human Destiny*, must have been one who first had taken leave of his sciences.

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Elements of Symbolic Logic. HANS REICHENBACH. New York: The Macmillan Company. 1947. xiii + 444 pp. $5.00.

This is, among other things, a textbook of logic, complete with exercises. The logic of truth functions and quantification is set forth with full attention to formal laws and practical procedures. The syllogism, Venn diagrams, class algebra, relation algebra, identity, descriptions, and the theory of types also come in for their share, and there are introductory remarks on the definition of number. In addition, however, the book is in part a treatise on the philosophy of logic and the logic of language. The author's views on the ontology and epistemology of logic, and on the modali-

ties and the contrary-to-fact conditional, are set forth at some length and with varying success. As a crowning novelty, there is a good analysis of everyday language in the light of modern logic.

In the chapter on truth functions, validity is tested by a technique of "case analysis" which is substantially truth-table computation. Rules for generating valid formulas deductively are also developed. In the succeeding chapter on quantification this deductive type of approach is fundamental, since no method of testing validity can be adequate to all of quantification theory. An extension of the case-analysis approach is presented, however, as a partial test of validity in quantification theory. This expedient, due to Dubislav, rests on the trichotomy "true for all x," "false for all x," and "mixed." It is adequate to a *portion* of *monadic* quantification theory, i.e., a portion of the theory of one-place predicates. The author shows awareness of this limitation, but no awareness that test methods have existed since 1915 for the *whole* of monadic quantification theory.[1]

Standards of rigor are uneven. In startling contrast to a quite rigorous and painstaking account of the grammar of statement connectives we encounter this slipshod "definition" (unjustly attributed to Peirce) in displayed italics (p. 36): "A tautology is a formula that is true whatever be the truth-values of the elementary propositions of which it is composed."

A particularly unhappy compromise between rigor and perspicuity appears in the pages on substitution in quantification theory, which are neither clear enough for the novice nor precise enough for the initiate. Moreover, this formulation has a drawback that goes beyond mere infelicity of expression; namely, it sanctions the inference of certain formulas in abbreviated notation without sanctioning, as on an equal footing, the inference of their definitional expansions. Definitions thus cease to be merely convenient or suggestive transcriptions, and become essential links in inferences which could not be repeated in primitive notation. The author does not speak of this changed estate of definitions, but he exploits it at length in his so-called α-method (pp. 229 ff).

Repeated lapses of rigor are to be noted in the use of quotation marks; e.g., "Let 's' be the next formula. . . . 'r' may contain free variables" (p. 175). A correct presentation would require metamathematical variables in place of the letter-quotations, and, in complex cases, recourse to quasi-quotation[2] or an equivalent convention. Does the author use quotation thus loosely in an effort

[1] See Leopold Löwenheim, *Math. Annalen*, Vol. 76 (1915), pp. 447–470; also my paper in *Journal of Symbolic Logic*, Vol. 10 (1945), pp. 1–12.

[2] See Quine, *Mathematical Logic*, pp. 33 ff.

merely not to overwhelm beginners? No, I fear his confusion is genuine. For on page 335 he undertakes explicitly to treat 'x' as a function of x, i.e., as the unique bearer of a certain relation ν to x. Tully being Cicero, the bearer of any relation ν to Tully is the bearer of ν to Cicero; we should have to conclude, therefore, that 'Tully' is 'Cicero.'

Portions of the exposition of logic have the air less of a systematic text than of the random jottings of a note-book. Thus, in the section on "Reduction of operations," the fact that all ternary truth functions are definable in terms of binary and "monary" (sic) ones is asserted without proof, though the proof would present little difficulty. No mention at all is made of quaternary and higher cases. Then, on the heels of these omissions, the uninvertibility of conjunction and alternation—a parenthetical point, remote from the subject of the section—is proved in full detail. These jottings can, of course, be rewarding; one such is the discussion of the commutative law for universal quantifiers, where it is shown that the law fails for "almost universal" quantifiers.

In its ontological aspects the treatment of quantification represents a step backward toward *Principia Mathematica*, in that it unnecessarily imports elaborate realms of entities: situations, properties, relations. Reichenbach speaks of situations as "unusual objects of thought" (p. 193) whose names are statements; and he explains properties and relations as "situational functions," i.e., functions taking situations as values. The ambiguous term "propositional function" of *Principia* is restricted by Reichenbach to metalogical use in speaking of names of situational functions.

No scrimper of universes, Reichenbach goes on still to introduce classes, distinguishing them notationally from monadic situational functions, or properties. He takes for granted a difference between a property which given objects share and the class of the objects which share it (cf. esp. p. 209); yet the difference for him is evidently not the one which marks classes off from properties in *Principia*, viz., the law of extensionality, since Reichenbach seems to regard this law as debatable even for classes (cf. p. 200). The only tangible reason he suggests for developing class theory, over and above the theory of situational functions, is that the notation is convenient; but this carries no weight, since he could have adopted this same notation for his situational functions outright. In developing the notions of relation algebra (converse, domain, relative product, etc.), oddly enough, he *does* see fit to work directly with his situational functions instead of switching over to a parallel theory of pair-classes. And then, at a late point in relation algebra where he proposes to define a few supplementary operations of his

own devising (pp. 211 ff), he unaccountably feels impelled to make the switch to pair-classes after all. (Incidentally, the new notations introduced at this point play fast and loose with variables with a perversity which must be seen to be believed.)

There are other hints that the author has odd ontological standards. Thus we read:

> A statement containing a proper name involves existence of a respective [sic] individual. . . . The knowledge thus conveyed by the occurrence of a proper name, however, is not knowledge concerning the physical world; it refers only to the language we use. All that a proper name tells us is that there is a thing corresponding to it; but such knowledge supplies an information only about language since it merely classifies the proper name as a term that denotes something. [P. 256.]

If he believes that objects, not merely abstract ones but hard individuals, can be created thus by a casual fiat regarding the classification of words, then no wonder he was so prodigal with his abstract entities. Surely, though, what he seems so clearly to say in the above quotation can not have been his intention.

In his general introductory remarks on semiotic, Reichenbach stresses the distinction between metalanguage and object language, and expounds the semiotic triangle and Morris's trichotomy of semiotic into syntax, semantics, and pragmatics. Concerning the problem of criteria of meaningfulness and synonymy, he writes, "We cannot enter upon this inquiry here and shall merely report that the answer has been given through the *verifiability theory of meaning*" (p. 7). Though feeling that his report is over-sanguine, I applaud his recognition that what are wanted are criteria of meaningfulness and synonymy, not realms of meanings; this parsimonious attitude contrasts markedly with the prodigality noted in earlier paragraphs of this review.

The word "tautology" is used by Reichenbach in the broad sense of "analytic statements." He asserts that "the statement that a given formula is a tautology, is not a tautology but an empirical statement" (p. 186). Whatever its warrant, this assertion plays an important part in Reichenbach's answer to the problem of the ultimate basis of logical justification. The problem is one of infinite regress: if logical truths are established by appeal to rules in the metalanguage, then we must fall back on the logic of the metalanguage in order to work with those rules [3] and also in order to assure ourselves of their consistency. Reichenbach's answer: since the statement that a statement is a tautology is empirical, the regress is broken by posits made on empirical evidence.

[3] Cf. Lewis Carroll, "What the Tortoise Said to Achilles," *Mind*, Vol. 4 (1895), pp. 278–280.

The modalities—both those turning upon logical necessity and those turning upon physical necessity—are sympathetically discussed, and an effort is made to translate them into an extensional metalanguage. This problem is, in the case of the physical modalities, precisely the problem of the contrary-to-fact conditional. The solution depends on defining *law*—or, as Reichenbach calls it, *nomological statement*. This he defines as a universally quantified statement fulfilling three conditions: it "contains no individual-signs," it is "demonstrably true," and it is "fully exhaustive." A word now on these three conditions. The purpose of the first condition is to withhold the status of law from truths which are essentially local in reference. Note, however, the dilemma: If by "individual-signs" Reichenbach means names of individuals, then their exclusion fails of its purpose, since non-names such as "solar," "terrestial," "up," "oriental," etc., can still engender localism; if on the other hand he means "individual-signs" to cover also words like "solar," etc., then the problem which remains to him of delimiting the category "individual-signs" threatens to be as serious as that of defining "law" itself.

The second condition, "demonstrably true," is explained briefly and vaguely as applying to statements "practically true on inductive evidence," and not excluding statements whose truth is unknown provided they are *capable* of being well established, deductively or inductively, on *possible* future evidence. Does this reference to "possible" future evidence smuggle in physical modalities? If so, the whole enterprise is vitiated by circularity; and, if not, it is up to Reichenbach to be more explicit.

Not that he has set his face against technical detail in these pages. The third condition, "fully exhaustive," is defined by a fully exhausting train of auxiliary concepts and constructions. Disheartened by the state of the other two clauses in the definition of nomological statement, however, I shall pass over "fully exhaustive."

If, for the sake of argument, one imagines "nomological" to have been satisfactorily defined, he can derive pleasure and instruction from Reichenbach's excellent pages on fictitious existence. Reichenbach introduces special quantifiers of a kind which behave as if they were quantifiers in the object language ranging over unactualized possibles—though actually no such realm of entities is presupposed, and the special quantifiers are explained away by metalinguistic paraphrase (depending on "nomological"). This approach makes neat work of such topics as propositional attitudes, non-existent objects of desire or intent, and characters in fiction.

Another phenomenon of everyday language which Reichenbach

takes up is that of what he calls "token-reflexive words," otherwise known as "indicator words"[4] and "egocentric particulars."[5] Since these words depend for their reference upon the individual utterance-event, Reichenbach deals with them by introducing into his metalanguage a new kind of quotation which produces names of sign-occurrences as opposed to sign-shapes.

Tense, which is token-reflexive in an implicit way, is well analyzed with help of diagrams. In this discussion, which is of general linguistic interest, special logical devices play little part. There then follow sixty pages on the parts of speech. The classification arrived at is in no sense a logical revision of language, but a taxonomy of English as it exists, together with contrasting instances from other languages. Good use is made of logic here, but only as an aid to understanding the essential functions of actual linguistic forms. Ironically, considering the title of the book, this chapter on "Analysis of Conversational Language" is the best.

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BOOK NOTES

Religion in Economics. A Study of John Bates Clark, Richard T. Ely, and Simon N. Patten. JOHN RUTHERFORD EVERETT. New York: King's Crown Press. 1946. xiii + 160 pp. $2.50.

The thesis of the book is stated in the author's "Concluding Notes," as follows:

> The three men herein studied present not only an economic but also a religious solution to the problems of their day. They are all sure that the economic problems of society will not solve themselves and that no mere reshuffling of social institutions will be sufficient. Against the determinism preached by Sumner and Marx they place voluntaristic conceptions with strong moralistic overtones. [P. 135.]

This thesis is supported by quotations and paraphrases arranged somewhat chronologically in the chapters on Clark and Ely and somewhat systematically in the study of Patten.

The author should be held only partially responsible for the dullness of the reading because he selected for study an especially drab period in the history of American economics. Fortunately, the American economy in the 'nineties did not depend upon the generalizations of its economists and the cliché-filled minds of the

[4] Nelson Goodman, *A Study of Qualities.* Dissertation, Harvard Library, 1941.

[5] Bertrand Russell, *Inquiry into Meaning and Truth,* pp. 134–143.

community that limited their theoretical development. The economists were also better than their theories. Mr. Everett might have spiced his book with more of the personal qualities and unsystematic thoughts by which all three of his subjects stimulated their colleagues and produced more than their share of competent students. (I recall that one of Patten's students testified that he did not follow the road that Patten pointed out to him, but he was grateful because Patten made him believe there were roads.) The author reproduces some of the economists' comments on labor unions, but does not reconstruct the exciting situations that were created when Clark, Ely, and Patten told their public that there were such things as unions.

It is doubtful whether this kind of research can ever be very illuminating. A volume, entitled *Religion in Physics,* could be written on the same model by running through the works of Galileo, von Guericke, and Newton, commenting on sentences that contain the words "Christian," "God," and "Church." Few insights would be developed because physics is unintelligible apart from its systematic exposition and religion is a vague word with many referents.

The limitations of the method used by the author are evident in his conclusions. Whereas Clark talked "natural and moral law" when he got into a tight spot (i.e., when confronted by a problem that his not inconsiderable economic theory could not handle), Ely insisted that changing conditions make previously just and workable principles unjust and unworkable. Here is a difference of prime importance to theology and philosophy. The matter is treated casually in a paragraph, whereas much is made of the agreement of Clark and Ely on supernaturalism, the fatherhood of God, and ecclesiastical doctrines that were accepted by practically all college professors of their generation. In the "Preface," the author says that much more intensive research is required before valid generalizations can be made. No intensification is needed if the generalizations are only to the effect that certain economists clung to certain religious beliefs. But perhaps the author has in mind the distinguishing of problems and contexts in which Clark, et al., did not invoke religious ideas, or some other such subtle study, which might bring out the assumptions and standards of the period.

The book is documented, and it has a bibliography, although the principal works of Clark, Ely, and Patten are not included in the bibliography.

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The Formal Distinction of Duns Scotus. MAURICE J. GRAJEWSKI. (The Catholic University of America Philosophical Studies, Vol. XC.) Washington, D. C.: The Catholic University of America Press. 1944. xv + 211 pp. $2.25.

This dissertation has the merit of seeking to understand the Scotish formal distinction in terms of the philosophy of Duns Scotus, without reduction to Thomism. The discussion, which moves wholly within the context and terminology of scholastic tradition, suffers from absence of any attempt to exhibit the more fundamental principles underlying Scotus' doctrinal formulations. It is, however, a useful contribution to the inadequate library of American studies of Scotist thought.

E. A. M.

NOTES AND NEWS

We regret to learn of the death of Charles H. Rieber, Professor of Philosophy and Dean Emeritus of Letters and Sciences at the University of California at Los Angeles, on February 28, 1948, at the age of 81.

The Johns Hopkins University will hold an international symposium on April 13, 14, and 15, 1948, on "The Great Critics," with Huntington Cairns as moderator. Papers will be delivered by John Crowe Ransom and Allen Tate from the United States, Herbert Read from England, Ernst R. Curtius from Germany, Benedetto Croce from Italy, and André Gide from France. Arranged by Elliott Coleman, the symposium will discuss Aristotle, Longinus, Goethe, Coleridge, Asinte-Beuve, and DeSanctis, with particular emphasis upon the pertinence of their writings to the critical and philosophical problems of the present day.

The date of the Tenth International Congress of Philosophy, which is being held in Amsterdam, has been set for August 11 to 18, 1948. Information may be obtained from Prof. Dr. E. W. Beth, Zweerskade 23 I, Amsterdam, Netherlands.